BT-2/M-23   42037
PROBABILITY AND STATISTICS
BS-134A

Time : Three Hours]   [Maximum Marks : 75

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. (a) In a bolt factory, machines A, B and C manufacture 25%, 35% and 40% of the total product respectively, of their outputs 5%, 4% and 2% respectively are defective bolts. A bolt is drawn at random from the product and is found to be defective. What are the probabilities that it was manufactured by machines A, B or C ?   8

    (b) Three students A, B and C write an entrance examination. Their chances of passing are 1/2, 1/3 and 1/4 respectively. Find the probability that at least one of them passes.   7

2. (a) A random variable X has the following probability function :

X	P(x)
0	0
1	k
2	$2k$
3	$3k$
4	$3k$
5	k^2
6	$2k^2$
7	$k + 7k^2$

(i) Find the value of the k

(ii) Evaluate $P(X < 6)$, $P(X \geq 6)$

(iii) $P(0 < X < 5)$. 8

(b) A die is tossed thrice. A success is 'getting 1 or 6' on a toss. Find the mean and variance of the number of successes. 7

Unit II

3. (a) X is continuous random variable with a probability density function given by :

$F(x) = k x \quad (0 \leq x < 2)$

$= 2 k \quad (2 \leq x < 4)$

$= -k x + 6 k \quad (4 \leq x < 6)$

Find k and the mean value of X. 8